VOL. XVI. JULY, 1891. NO. 7.

THE BOTANICAL GAZETTE

EDITORS:

JOHN M. COULTER, University of Indiana, Bloomington, Ind.
CHARLES R. BARNES, University of Wisconsin, Madison, Wis.
J. C. ARTHUR, Purdue University, Lafayette, Ind.

CONTENTS:

Undescribed plants from Guatemala, IX. (With plates XVI-XVIII.)—*John Donnell Smith* 191

On certain new or peculiar North America Hyphomycetes, II. (With plates XIX-XX.)—*Roland Thaxter* 201

Notes on North American Mosses.—*Charles Reid Barnes* 205

BRIEFER ARTICLES 208
Penetration of the host by Peronospora gangliformis: *W. H. Rush*.

EDITORIAL 209
The opportunities of the Botanical Club. A. A. A. S.

CURRENT LITERATURE 210
Practical Botany.—The new Gray's Manual.—Introduction to the study of botany.

OPEN LETTERS 215
The Manchester group of botanists.—Monomialism.

NOTES AND NEWS 217
Personals.—Errata.—Zoe.—Botanical directories.—A new journal of pathology.—California Botanical Club.—Germs of swiue diseases.—Postage on dried plants.

[ISSUED JULY 20.]

CRAWFORDSVILLE, INDIANA.
PUBLISHED BY THE EDITORS.

Tracy, Gibbs & Co., Printers, Madison, Wisconsin.

Address C. R. BARNES at Cambridge, Mass., until Sept. 1.

THE BOTANICAL GAZETTE.

A Monthly Journal Embracing all Departments of Botanical Science.

ANNUAL SUBSCRIPTION, $2.50.

SINGLE NUMBERS, 25 CENTS.

The subscription price is an invariable one, no concession being made to dealers or agents.

In Great Britain, 11 shillings. Agent, W. P. COLLINS, 157 Great Portland St., London, W.	In Germany, 11 marks. Agent, R. FRIEDLÄNDER & SOHN, 11 Carlstrasse, Berlin, N. W.

Subscriptions and correspondence should be addressed to ***Charles R. Barnes, 712 Langdon St., Madison, Wisconsin;*** money orders and drafts should be made payable to the BOTANICAL GAZETTE.

Separate Copies.—Contributors are entitled to 25 separate copies of their articles (free) when 2 pp. or more long. Additional copies will be furnished at cost. *The number desired must be marked at the head of the MSS. as none will be printed unless ordered.*

Manuscripts.—Contributors are requested to prepare MSS. exactly in the form in which they wish the article to appear, having due regard to the general style of composition shown in the pages of the GAZETTE. Scientific and proper names should be written with particular care.

Illustrations.—Articles requiring illustrations should be sent to ***J. C. Arthur, Purdue University, Lafayette, Ind.***

[Entered at the Post-office at Crawfordsville, Ind., as second-class postal matter.]

BAUSCH & LOMB OPTICAL CO.,

MANUFACTURERS OF

MICROSCOPES, TELESCOPES,

PHOTOGRAPHIC LENSES,

And Other Optical Instruments.

Factory and Office: ROCHESTER, N. Y.—531-543 N. St. Paul St.

Branch Office: NEW YORK—48-50 Maiden Lane.

Eleventh edition of illustrated catalogue, with a number of improvements and additions in the line of microscopes, will be sent free on application to any person interested in microscopy.

C.T. Foxon del.

B. Mintern Lith. Boston

FIMBRISTEMMA CALYCOSA, n. sp

C. E. Faxon del.

B. Meisel, lith. Boston.

BESLERIA PANSAMALANA, n.sp.

C.E. Faxon, del.

H. Meisel, lith. Boston

MACFADYENA SIMPLICIFOLIA, n. sp.

VOL. XVI. NO. 6.—BOTANICAL GAZETTE.—JULY, 1891.

Undescribed plants from Guatemala. IX.

JOHN DONNELL SMITH.

(WITH PLATES XVI, XVII, XVIII.)

New species, described by Prof. L. Radlkofer and by Dr. M. T. Masters, are included among those of this paper.

Serjania rufisepala Radlk.—Scandens, fruticosa, glabra; rami canaliculato-6-sulcati, cortice subfusco; corpus lignosum simplex, sulcatum (fasciculis vasorum angulis subjectis corporum lignosorum periphericorum speciem interdum præbentibus ut in Serjania sordida affinibusque); folia biternata; foliola sat magna, elliptica, superiora acuminato-cuspidata, terminalia in petiolulum attenuata, lateralia sessilia, omnia integerrima, subcoriacea, penninervia, nervis lateralibus utrinque 5–6 validioribus arcuato-adscendentibus supra subtusque prominulis, utrinque glaberrima, nec nisi glandulis microscopicis adspersa, supra nitida, fuscescenti-viridia, punctis pellucidis subfuscis notata, epidermide mucigera; petioli omnes nudi; thyrsi in ramis lateralibus paniculatim congesti; cincinni sessiles; flores minores; sepala omnia rufescenti-tomentella; fructus (—immaturi tantum suppetebant) pulchre sanguinei, breviter ovati, loculis canescenti-puberulis, alis glabris.

Rami thyrsigeri diametro 4–5 mm. *Folia* circ. 20 cm longa, 14 cm lata; foliola terminalia petiolulo 8 mm longo adjecto 11 cm longa, 5 cm lata, lateralia decrescentim minora; petiolus communis 3.5 cm longus; stipulæ minutæ. *Thyrsi* circ. 7 cm longi, rhachi puberula; cincinni abbreviati; pedicelli breves, fructigeri 3 mm longi. *Flores (masculi)*: sepala interiora 2.5 mm longa. *Petala* sepalis vix longiora, intus glanduligera; squamæ superiores crista bifida appendiceque deflexa brevi dense villoso-barbata, inferiores crista oblique dentiformi instructæ. *Tori* glandulæ ovatæ, basi puberulæ. *Staminum* filamenta villosiuscula, antheræ glabræ. *Germinis* rudimentum parvum, trigonum, puberulum. *Fructus* (immaturus) 2–2.2 cm longus, 1.8 cm latus.—*Obs.* Affinis *Serj. sordidæ* Radlk. (Sect. xi; cf. Radlk. Serjaniæ Monogr. p. 272; Suppl. p. 141).

Tres Cruces, Dept. Alta Verapaz, alt. 4,800 ft., Apr. 1889, J. D. S., (Ex Pl. Guat., qu. edid. J. D. S., 1766).

Serjania psilophylla Radlk. (*Serjania spec.*, John Donnell Smith Enumeratio Plantarum Guatemalensium, Pars I, 1889, n. 1153.)—Scandens, fruticosa, glabra; rami 6-sulcati, cortice e viridi pallide subfusco, ad costas rubescente; corpus lignosum simplex, hexagonum, leviter sulcatum; folia biternata; foliola ex oblongo vel ovato lanceolata, præsertim terminalia

in acumen acutum sensim attenuata eademque in petiolulum conspicuum attenuata, lateralia in petiolulos breves contracta vel subsessilia, omnia integerrima, penninervia, nervis lateralibus utrinque 7–9 curvato-adscendentibus supra subtusque prominulis, infimis eorum reliquis vix longioribus, utrinque glaberrima, nec nisi glandulis microscopicis adspersa, nitidula, submembranacea, e viridi pallide fuscescentia, punctis lineolisque pellucidis subfuscis notata, epidermide mucigera; petioli omnes nudi; thyrsi in ramulis lateralibus paniculatim congesti, glabri; cincinni subsessiles; flores mediocres; sepala pulverulento-puberula; fructus . . . .

Rami thyrsigeri diametro 3 mm. *Folia* 18–20 cm longa; foliola terminalia petiolulo 6 mm longo adjecto 10.5 cm longa, 3 cm lata, lateralia decrescentim minora; petiolus communis 1 cm longus; stipulæ minutæ. *Cincinni* contracti, circ. 6-flori; pedicelli 2–2.5 mm longi, supra basin articulati; alabastra obovoidea, 2 mm longa. *Flores hermaphroditi; sepala* interiora 3 mm longa. *Petala* ex oblongo attenuata, 3.5 mm longa, intus laxe glanduligera; squamæ (cristis exclusis) petala dimidia æquantes, margine villosiusculæ, superiores crista usque ad basin bifida (laciniis subacutis erectis) appendiceque deflexa brevi obtusa dense villoso-barbata, inferiores crista corniformi erecta instructæ. *Tori* glandulæ ovatæ. *Stamina*: filamenta villosiuscula; antheræ glabræ. *Germen* pyriforme, trigonum, minutim canescenti-puberulum; stylus brevis; stigmata stylum æquantia.—*Obs.* Affinis *Serj. acutæ* Tr. et Planch. (Sect. xi; cf. Radlk. Serjaniæ Monogr. p. 274. Suppl. p. 142).

Rocks at Coban, Dept. Alta Verapaz, alt. 4,300 ft., March, 1887, v. Türckheim, (Ex Pl. cit. 1153).

Serjania rachiptera Radlk.—Scandens, fruticosa, glabriuscula; rami 6-costati, striato-sulcati, glabri, juniores tantum crispato-puberuli, cortice viridi ad costas pallide subfusco; corpus lignosum simplex, sulcatum, medulla ampliore repletum; folia ambitu triangularia, bipinnata vel pinnarum infimarum pinnulis infimis in foliolorum triades dissociatis transeuntia insupra decomposita, 6–8-juga, pinnis inferioribus 4-jugis, superioribus decrescentibus, summis foliola simplicia exhibentibus; foliola (pinnulæ) parva lateralia elliptica vel suborbicularia, terminalia subrhombea cum lateralibus proximis interdum confluentia, omnia sessilia, paucidentata, subchartacea, utrinque glabra nec nisi glandulis microscopicis adspersa, viridia, subtus pallidiora, punctis lineolisque pellucidis obsoletius notata, epidermide mucigera; petiolus communis perbrevis, nudus, margine hirtellus, rhachium omnium segmenta omnia alata, supra ad lineam medianum puberula; thyrsi solitarii vel in ramulis lateralibus paniculatim congesti, graciles; cincinni stipitati, abbreviati, puberuli; flores mediocres, albidi; sepala exteriora laxius, interiora basi densius puberula; fructus . . .

Rami thyrsigeri diametro 2 mm. *Folia* inferiora 14 cm longa, 9 cm lata; foliola terminalia 2.5 cm longa, 1.2 cm lata, lateralia inferiora (suborbicularia) diametro circ. 1 cm, superiora (elliptica) minora, angustioria; petiolus communis 0.5 cm, vix excedens, rhacheos primariæ segmenta inferiora 2 cm longa, 4 mm lata, superiora decrescentim breviora pinnarum vix 1 cm longa; stipulæ parvæ, ovato-triangulares. *Thyrsi* folia superantes, inferiores 16–18 cm longi, rhachi pedunculum communem glabrum gracilem apice haud raro circinatum subæquante puberula dense cincinnifera; cincinni stipite 4–5 mm longo suffulti, 7-9-flori, puberuli; pedicelli 2.5 longi, prope basin articulati; alabastra obovoidea, pedicellos æquantia. *Flores masculi: sepala* interiora 3.5 mm longa. *Petala* spathulata, sepala vix superantia, intus laxe glanduligera; squamæ superiores crista emarginato-bifida (laciniis acutis patulis) appendiceque deflexa brevi barbata, inferiores crista sat alta oblique emarginata instructæ. *Tori* glabri glandulæ superiores semiorbiculares, inferiores minores. *Staminum* filamenta pilosiuscula; antheræ glabræ. *Germinis* rudimentum trigonum, glanduligerum, ceterum glabrum.— *Obs.* Affinis *Serj. Cambessedeanæ* Schlecht. et Cham. Sect. xii; cf. Radlk. Serjaniæ (Monogr. p. 290; Suppl., p. 150.)

Guarda Viejo, Dept. Guatemala, alt. 5,000 ft., Febr., 1890 J. D. S., (Ex Pl. cit. 1907).

Paullinia scarlatina Radlk.— Scandens, fructicosa; rami juniores pentagoni puberuli, adultiores subteretes, striati, lenticellorum seriebus notati; corpus lignosum simplex; folia 5-foliolato-pinnata; foliola superiora ex elliptico sublanceolata, inferiora ovata, apice in acumen obtusum producta, basi superiora longius breviusve attenuata, inferiora rotundata, omnia breviter petiolulata, integerrima, vel dente uno alterove notata, chartacea, transversim venosa, præter axillas nervorum subtus barbatas glabra, nitidula, glandulis, microscopicis curvatis obsita, utriculis laticiferis reticulatis pellucidis sat crebris supra subtusque instructa, epidermide mucigera; petiolus basi utrinque vasorum fasciculo corticali instructus; rhachis submarginata; stipulatae parvæ, triangulares; thyrsi solitarii, axillares; bracteæ bracteolæque parvæ, subulatæ; flores sat magni, sepalis 3–5 fere omnino liberis; fructus ellipsoideus stipitatus, subapiculatus, valvarum costa mediana evanina tricostatus, extus glabriusculus, intus pilis longis fuscidulis dense villosus; semen late ovoideum, ventre subcarinatum, glabrum, arillo dorso fisso usque ad medium obtectum; cotyledones oleigeræ, interior tenuior, transversim plicata.

Rami thyrsigeri diametro 3.5 mm, cortice subfusco. *Folia* circ. 16 cm longa totidem lata; foliola 10–12 cm longa, 4.5–5 cm lata, sicca subfusca; petiolus communis 3–4 cm longus, supra sulcatus, rhachis paullo brevior; stipulæ 2.5 mm longæ. *Thyrsi* folia subæquantes, robusti, pedunculo quam rhachis tomentella longiore; rhachis (fructifera) diametro 2–2.5 mm, sat dense cincinnigera, cincinnis sessilibus contractis; pedicelli fructigeri 6–7 mm longi, paullo supra medium articulati. *Sepala* (calycis fructiferi) tomentella, duo exteriora breviora, interiora circa 4 mm longa. *Tori* glandulæ ovatæ, pubescentes. (Reliquæ floris partes non suppetebant.) *Fructus* stipite 5–6 mm longo adjecto

2.5–3 cm longus. *Semen* 1.3—1.4. cm longum, testa atro-fusca, pilorum endocarpii impressione leviter striolata, nitidula.—*Obs.* Affinis *Paullinia costata* Schlechtend. et Cham.

Boca del Cajabon, Dept. Yzabal, alt. 350, Apr., 1889, J. D. S. (Ex Pl. cit. 1662).

Spondias Radlkoferi.— Leaves 7–9 jugate, about a foot long; leaflets granular-punctate, the upper pairs oblong-lanceolate (30–38 × 10–13 l.), the lower rhomboidal and smaller, obliquely and acutely caudate, midrib and 6–8 costal nerves pubescent: pedicels bracteose at base, shorter than buds, clustered toward apex of short tertiary branches of panicle: calyx-lobes round-ovate, obtuse: disk fleshy, depressed, pulvinate, radiate, pulverulent: anthers small, quadrate: ovary 3–4-locular, styles pointed: fruit not seen.— A species, otherwise similar to *S. lutea* L., to which as probably new my attention has been directed by Prof. L. Radlkofer, the eminent monographer of *Sapindaceæ*.— Escuintla, Dept. Escuintla, alt. 1,100 ft., Apr. 1890, J. D. S., (Ex. Pl. cit. 2087).

Galactia discolor.— Fruticose, erect (2–3 ft.), cano-pubescent: stipules filiform; leaflets twice to thrice exceeding petiole, shortly and subequally petiolulate, coriaceous, green and glabrate above, silvery lanate beneath, lanceolate to elliptical-oblong (20–42 × 6–16 l.), the terminal the greater, acute or obtuse at each end, apex mucronate or retuse: racemes subsessile, short (10–18 l.); flowers 6–12, half an inch long, purple: calyx-tube shorter than pedicel and filiform bractlets, its segments 4 times longer and nearly equaling petals: the vexillary round-oval, auriculate, not inflexed, its filament free: ovary silvery lanate.— *G. Jussiæana* HBK., likewise with habit of *Collæa* and flowers of *Eugalactia*, differs chiefly by smaller elliptical leaves emarginate at base with the terminal one remote, minute stipules and bractlets, less deeply parted calyx twice exceeded by roseate petals, the vexillary obovate and exappendiculate.— Santa Rosa, Dept. Baja Verapaz, alt. 5,000 ft., July, 1887, v. Türckheim, (Ex Pl. cit. 1321).

Oreopanax oligocarpum.— Arborescent, nitidous except sparsely stellate-pubescent panicle: leaves crowded at apex of branchlets and at intervals below, exstipulate, coriaceous, entire, 3-nerved, lanceolate (6–9 × 1–1¾ in.), apex acutely produced, base acute, petioles from a third to more than half as long and tumid at each end: panicle sessile, corymbiform,

subequalling petioles; heads small (in anthesis scarcely 2 lines in diameter), much exceeded by peduncles, loosely 5–8-flowered: of masculine flowers calyx obsolete, petals 4 and equalling filaments, styles united; feminine flowers not seen: berries 3–4 to a head, globose-ovoid, sulcate, 6–7-seeded, crowned with persistent radiate styles. — *O. capitata* Dcne. et Planch., a nearly related species, differs by stipulate leaves ovate to obovate, large diffuse panicle of shortly pedunculate many-flowered heads, petals 5, long-exsert stamens and free styles of masculine flowers. — Pansamalá, Dept. Alta Verapaz, alt. 3,800 ft., Apr. 1889, J. D. S., (Ex Pl. cit. 1743). Collected also by Sor. Juan Cooper near Cartago, Costa Rica, alt. 5,000 ft., Mch. 1888, No. 322.

Parathesis sessilifolia. — All parts except nitid upper surface of leaves rufo-tomentose with long-stipitate stellate hairs: leaves oblanceolate (6–8 × 1¾–2 in.), acuminately produced, tapering from above middle to acute sessile base, pergameneous, subcrenulate, both surfaces nigro-punctate and finely reticulate: panicle terminal, exceeding leaves, pyramidate, lower branches leaf-bracted: flowers 6–10, corymbosely fasciculate toward apex of secondary branches, subequalling pedicels, in all parts linear-maculate, filiform bractlets a half shorter: sepals acutely lanceolate (½ l.): segments of corolla linear-lanceolate (2½ l.), glabrous within, revolute: anthers affixed near base, oblong (1¼ l.), thrice exceeding filament: berry 4 l. in diameter. — Peculiar by indument and sessile leaves. — Coban, alt. 4,300 ft., Aug. 1886, v. Türckheim, (Ex Pl. cit. 1443).

Parathesis pleurobotryosa. — Fusco-tomentulose: leaves elliptical (4–6 × 1½–2 in.), ends similarly acute, subentire, glabrate above, epunctate, opaque, 14–18 costal nerves distinct: panicles axillary, equalling leaves, racemiform, short branches terminated by 3–5 umbellately clustered minutely bracteolate pedicels equalling scarcely maculate flowers: corolla-segments ochracco-furfuraceous on both sides: anthers short (¾ l.), equalling filament: ovary smooth: berry not seen. — Anthers excepted flowers are similar in form and dimensions to those of preceding species. *P. melanosticta* Hemsl., (Ex Pl. cit. 1706), with inflorescence also strictly axillary, differs by glabrity, nigro-punctate oblong-elliptical leaves acuminate at apex and long-tapering into petiole with more numerous costal nerves uniting in marginal arches, com-

pound panicles, ovate sepals, half smaller white maculate flowers, lanceolate corolla-segments smooth without and albo-furfuraceous within, pubescent ovary. — Santa Rosa, alt. 5,000 ft., Sept. 1888, v. Türckheim, (Ex pl. cit. 1,442).

Fimbristemma calycosa. — Leaves oblong-cordate (4–6 in.), abruptly acuminate: peduncles (6–10 l.) exceeded by petioles, the much longer pedicels cymosely and radiately 6–8 fasciculate, flowers an inch in diameter: segments of calyx oval, pallescent: segments of corolla somewhat longer, narrower, glabrous, dark-yellow, dextrorsely convolute: exterior crown lobeless, densely long-fimbriate; lobes of the interior ovate, equalling fringe, bidentate, naked: anthers appendiculate below with a bicornute wing, caudicle nearly as long as pollen-mass: follicle not seen. — *Fimbristemma*, as limited by Turczaninow and not of Bentham and Hooker, is represented by one other species, *F. gonoloboides* Turcz., which differs *ex char.* by peduncles exceeding petioles and bifid, half larger corolla twice exceeding calyx, lobed exterior crown, lobes of the interior entire and with an inner cucullate appendage, anthers tipped with a membrane. *Callcolepium Warszewiczii* Karst., cited by Benth. & Hook. as a second species of *Fimbristemma*, is maintained by its author to be generically distinct by form of crown, and to belong by position of pollen-masses to the group of *Cynancheæ* rather than to *Gonolobeæ*, (Botan. Jahrb. viii. 360). — Chucaneb Mt., Dept. Alta Verpaz, alt. 6,000 ft., Apr. 1889, J. D. S., (Ex Pl. cit. 1,500).

Explanation of Plate XVI. — Fig. 1, flowering branch. Fig. 2, flower with calyx and corolla removed. Fig. 3, exterior crown. Fig. 4, interior crown. Fig. 5, pistil. Fig. 6, pollen-masses. (Fig. 1 is natural size, the others are variously enlarged.)

Nephradenia fruticosa. — Erect virgate shrub 6–8 ft. high: leaves linear-lanceolate (6–8 × 1–1¼ in.), tapering acutely to apex and short (5–7 l.) petioled, eglandular, pale beneath, conspicuous arching veins about 15 to a side: cymes extra-axillary, scarcely half as long as leaves, pedicels exceeded by peduncle and 3–8-subfasciculate in one or two bracteose clusters: corolla rugose, 15-nerved, pale-yellow, 9 lines broad, semi-fid, tube twice exceeding oval ciliate calyx-segments, half-oval lobes naked and emarginate: processes of crown equalling gynostegium, half-free; the adnate half small, triangular, inflated and concavely bilobate at base, margin entire, prolonged into subulate free upper half; pollen-masses

attached at base: stigma convex, exumbonate: immature follicle fusiform, tapering to long stipe.—*N. neriifolia* Benth. et Hook., the nearest congener, is a herbaceous perennial with linear-oblong leaves rounded and glandular at base, ciliate corolla, adnate coronal processes cymbiform, stigma umbonate.—Rocky islands in Rio Rubelcruz, Dept. Alta Verapaz, alt. 2,500 ft., May 1887, v. Türckheim, (Ex Pl. cit. 1,251); same locality, Apr. 1889, J. D. S., (Ex Pl. cit. 1,742).

Solenophora erubescens.—Glabrous, rubescent, tumid nodes marked by an interpetiolar line: leaves oval to elliptical-oblong, the larger in the pairs 2–3½ in. long, the other a third smaller, apex acutish, base inequilateral, coriaceous, rubescent beneath, indistinctly sinuate-serrate, petioles from ¼ to ¾ as long as leaves: flowers single on shorter axillary peduncles bibracteate in middle, or few in trichotomous cymes chiefly terminal: calyx coriaceous, 5-costate, rubro-maculate, obconic (9 l.), in flower ¼- and in fruit ½-adnate, lobes ovate (2 l.): corolla infundibuliform, twice exceeding calyx, yellow, ⅔-tubular, limb expanding to 8 lines broad; lobes suberect, transversely oblong (2×5 l.), the interior the greatest and pectinate-crenate: style 2-lobulate: fruit baccate, oval (5 l.), crimson, crowned with persistent 2-lobed gland.—Habit peculiar by glabrity and small leaves.—Rocks of a waterfall, Pansamalá, alt. 3,800 ft., May 1887, v. Türckheim, (Ex Pl. cit. 731); same locality, Apr. 1889, J. D. S., (Ex Pl. cit. 1,684).

Besleria Pansamalana (*Podobesleria* Benth. et Hook.).—Epiphytal, repent, ligneous branches ascending a foot or two, pubescent: leaves shortly petiolate, unequal in the pairs, obovate-oblong (5–6 in.), the lower smaller and obovate-rhomboid, acuminate, base obliquely acute, serrulate above middle, under surface pale-pubescent: peduncles single from one or both uppermost axils, half as long as leaves, 1-flowered: calyx-segments nearly distinct, ovate (4–5 l.), green, plurinerved, the 2 exterior narrower: corolla from narrow saccate base horizontally supine, ventricosely calceiform, 14 lines long, less than half as high, crimson; throat facing upwards midway between base and ventral apex, constricted (3 l.); divisions of small limb roundish, unequal, erect: genitals included: cells of anthers forming nearly a circle, connective orbicular: disk annular: style short (3 l.), ⅓-bilobed.—Related to *B. Onogastra* Hanst. by the corolla curiously resembling the lip of *Cypripedium*, but distinct by inflorescence, calyx,

etc.—Pansamalá, alt. 3,800 ft., Jan. 1887, v. Türckheim, (Ex Pl. cit. 196); same locality, Apr. 1889, J. D. S., (Ex Pl. cit. 1,798).

EXPLANATION OF PLATE XVII.—Fig. 1, flowering branch. Fig. 2, corolla laid open. Fig. 3, stamen. Fig. 4, pistil. (Fig. 1 is natural size; the others are variously enlarged.)

Macfadyena simplicifolia.—Erect (12–15 ft.), compressed branchlets dichotomous, articulations of petioles and pedicels glandular: leaves simple, elliptical (5–7½ × 2–3 in.), acute at each end, beset with cystoliths: flowers few, opposite in terminal short racemose clusters, short pedicels little exceeding subulate bractlets: calyx lanceolate (18–22 l.), acuminate, in anthesis closed at apex and base: corolla twice longer, white, tubulose-infundibuliform, throat ½ in. wide, lobes roundish (6–9 l.): oblong anther-cells divergent at base, staminode not present: disk cupular: stigma minutely lamellate: ovules 2 to each placenta, superposed, wings hyaline: capsule not seen.—Anomalous by erect habit, simple leaves and terminal inflorescence.—Borders of forest, Pansamalá, alt. 3,800 ft., Aug. 1886, v. Türckheim, (Ex Pl. cit. 1,030).

EXPLANATION OF PLATE XVIII.—Fig. 1, flowering branch. Fig. 2, corolla laid open. Fig. 3, pistil with half of calyx. Fig. 4, anthers. Fig. 5, stigma. Fig. 6, vertical section of ovary. (Figs. 1–3 are natural size; the others are magnified.)

Henrya imbricans.—Stems several from base, a foot or more long, decumbent, smooth, white, nodes verrucose: young leaves small (1 in.), ovate, acuminate, mucronate, long petiolate, pubescent: spikes short, densely flowered, 2–3-subfasciculate, axillary, or leafy-bracted in a long slender terminal panicle: bractlets simulating involucres, oblanceolate, mucronate; involucres a third longer (5 l.), imbricating, valves mucronate: corolla large (6 l.), exsert in bud: anther-cells elongate-oblong.—Both *H. scorpioides* Nees and *H. costata* Gray differ conspicuously from above by simply spicate loosely interrupted inflorescence; the former also by glandulose leaves acute at base, minute roundish bractlets, half smaller flowers, elongated style; the latter also by pluricostate shortly petiolate leaves, small cuspidate involucres.—Banks of Laguna Amatitlan, Dept. Amatitlan, alt. 3,900 ft., Febr. 1890, J. D. S., (Ex. Pl. cit. 1,923).

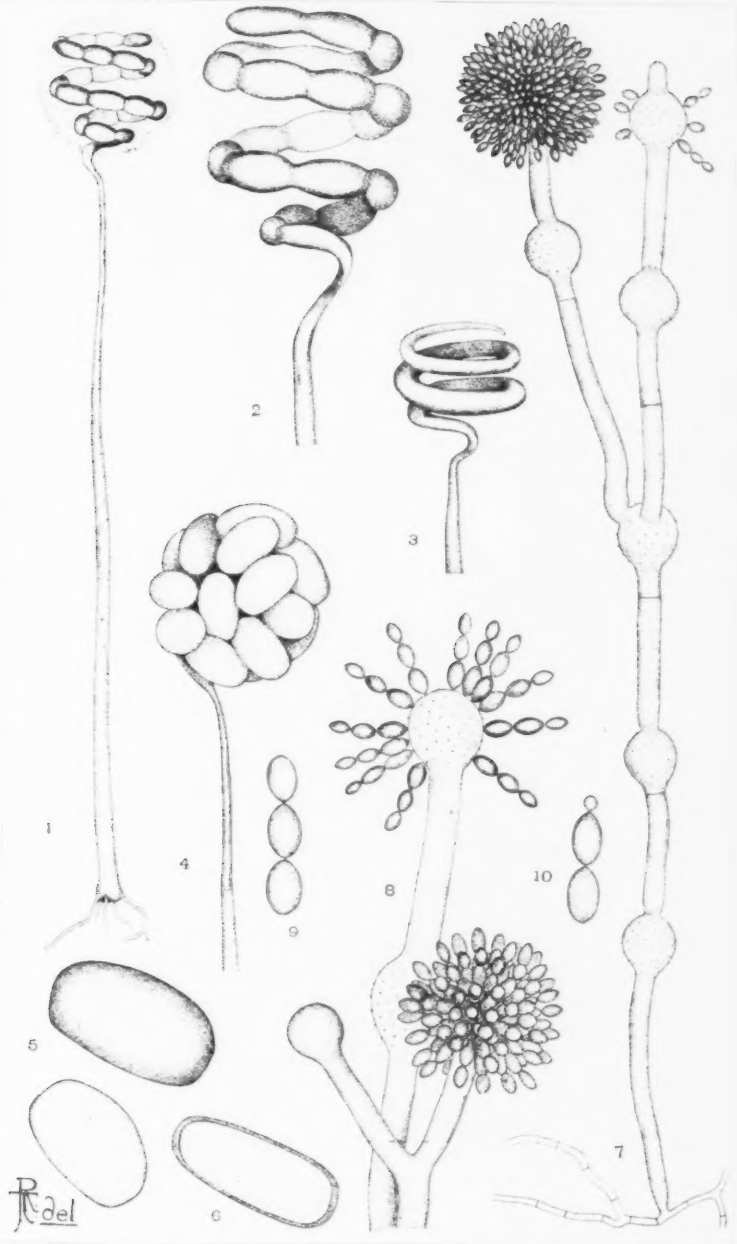
PISONIA ACULEATA L., var. **macranthocarpa.**—Spines infra-axillary, straight: pedicels of large (6 in.) cymes 1½–2 in. long; fruit obovate (9 l.), half as broad, glands long-stipitate.—Escuintla, alt. 1,100 ft., Apr. 1890, J. D. S., (Ex. Pl. cit. 2,091).

Neea psychotrioides.— Fruticose (6–8 ft.), dichotomous, smooth except rufo-fuscous pubescence of younger parts and inflorescence, branchlets terete and grayish: leaves subopposite, 4-verticillate at forks, unequal in the pairs, equilateral, oblong (4–5 × 1¼–1½) in., acuminate, base rounded, petioles short (2–4 l.); corymbiform cymes long pedunculate from forks of branches, subequaling leaves, axes 3–5-approximated and in fruit divaricate, cymules 3-flowered; calyculate bracts 2–4, subulate (¼ l.), persistent: staminate perianth not seen; the pistillate nearly sessile, oval (2 l.), mouth contracted, rudimentary stamens 8–10, ovary globose, style subexsert, stigma dilated: anthocarp ellipsoid (3½ × 2 l.), compressed, pubescent, pluristriate, constricted below tomentulose limb.— *N. Wiesneri* Heimerl, nearly related as described and figured in detail (Botan. Jahrb. xi. 89, t. ii), differs by elliptic-lanceolate leaves dimorphous in the pair, terminal 2–3-chotomous open glabrous inflorescence, slender elongated pedicels, ovate-tubulous perianth, fimbriate stigma, glabrous terete anthocarp not striate. *N. oppositifolia* Ruiz et Pav., also related, is distinguished by elongated 5-staminate perianth, etc.— Escuintla, alt. 1,100 ft., Mch. 1890, J. D. S., (Ex Pl. cit. 2,069).

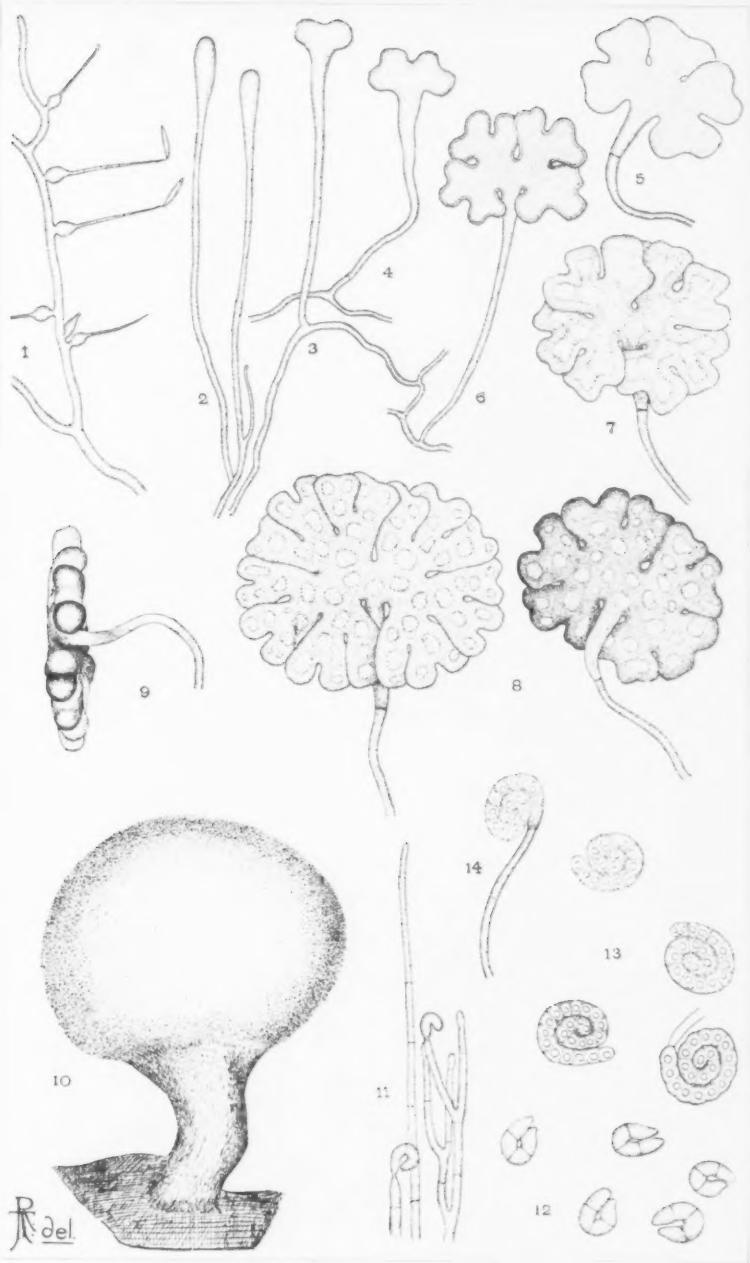
DALECHAMPIA SCANDENS L., var. **trisecta.**— Leaves glabrate, elobate and cordate-ovate, or chiefly trisect with petiolulate leaflets.— San Juan Mixtan, Dept. Escuintla, alt. 500 ft., Apr. 1890, J. D. S., (Ex. Pl. cit 2,079.)

Pirus (§ PSEUDOSTROBUS) **Donnell-Smithii** Mast.— Arbor altitudine mediocris vel humilis; ramulis crassis asperatis; squamis fulcrantibus 10–12 mm. long. subcoriaceis castaneis lanceolatis longe acuminatis margine laciniato-fimbriatis, fimbriis ascendentibus vix intertextis; fasciculis dense approximatis 5-phyllis basi vaginatis, vaginis circa 12 mm. long. e squamis lanceolatis pluribus constantibus, squamis infimis subcoriaceis ad margines integris sursum paulatim increscentibus, squamis mediis ad margines albidis longe fimbriatis, fimbriis horizontaliter divergentibus intertextis fasciculum obvolventibus, squamis summis hyalinis integris; foliis circa 13 cm. long. 1 mm. et ultra lat. rigidis triquetris ad angulos serrulatis apice subulatis, canalibus resiniferis parvis paucissimis sub epidermide positis ? vel nullis; stomatibus in utroque latere per series 6–7 dispositis; amentis masculis pluribus ad apices ramulorum capitatim-aggregatis, singulis 25–30 mm.

long. 5–7 mm. lat. erectis vel ascendentibus rectis cylindratis obtusiusculis basi bracteis subcoriaceis castaneis suffultis, bracteis infimis margine albido-fimbriatis, bracteis summis margine integris albido-limbatis; antherarum connectivis subor-bicularibus erosis aurantiaco-purpureis; amentis feminiis pedunculo deflexo crasso impositis, curvatis cylindrato-conicis; squamarum apophysibus valde promimentibus deflexis carnoso-coriaceis irregulariter sub-5-angulatis carina transversa brevi notatis, medio depressis, umbone lato deltoideo deflexo; strobilis adultis pendulis circa 10 cm. long. 6-7 cm. lat. cylindrato-oblongis apice obtuse conoideis, (squamis autem siccitate a sese separatis strobilus ovoideo-subglobosus evadit); squamis lignoso-coriaceis crassiusculis apophysibus circa 10 mm. long. 16 mm lat. rhomboideis sub-pyramidatis apice cum umbone excentrico reflexis; seminibus circa 2 cm. long. 5 mm. lat. superne alatis, ala membranacea pallide fusca angusta oblonga margine hinc paullo crassiore recta illinc tenuiore falcatim curvata.—De hac specie insigni et, ut videtur, hactenus indescripta, nec non strobilorum squamarumque notis valde distincta ita in litt. scribit oculatissimus repertor: "Abunde occurrit versus cacumen montis, et etiam ad ejus culmen, ad alt. 12,300 ped. ubi autem arbor pumila 10-12 ped. tantum evadit." Cl. Godman etiam qui hanc 'speciem loco eodem observabit abhinc annos triginta tradit hancce arborem cingulam circa montem efficere ad alt. 10,000 ped. usque ad culmen aliis arboribus nullis intermixtis. In opere laudato auspiciis cl. Godman edito et a sollerte Hemsley confecto, cui nomen Biologia Centrali-Americana, vol. iii, arbor haecce obiter injecta est, nomine tamen et descriptione omnino praetermissis.—Summit of Volcan de Agua, Dept. Zacatepequez, alt. 12,300, Apr. 1890, J. D. S., (Ex Pl. cit. 2182).



THAXTER on HYPHOMYCETES.



THAXTER on HYPHOMYCETES.

On certain new or peculiar North American Hyphomycetes. II.

Helicocephalum, Gonatorrhodiella, Desmidiospora nov. genera and Everhartia lignatilis n. sp.

ROLAND THAXTER.

(WITH PLATES XIX AND XX.)

Helicocephalum nov. gen. — Sterile hyphæ of small diameter, aseptate or rarely septate, creeping over the substratum and giving rise to highly differentiated, erect, simple, aseptate sporiferous hyphæ furnished with rhizoid like attachments at the base and spirally coiled at the apex: the spiral portion becoming septate and constricted at intervals, its segments separating at maturity in the form of large, dark colored, thick walled spores.

Helicocephalum sarcophilum n. sp. — Plate XIX, figs. 1–5.

Sterile hyphæ hyaline, creeping, branched, 2μ in diameter. Fertile hyphæ hyaline, 1 mm. or more in height, 20–25μ in diameter near the base and 8–10μ near the apex: tapering gradually upwards from a slightly swollen base: two or three times abruptly spirally coiled at the distal end, the spiral portion of large diameter and converted at maturity into a chain of seldom more than twenty-one spores, by the formation of successive septa. Spores brown, thick walled, with finely granular contents, asymmetrical, usually obliquely truncate, or not evenly rounded, at either end; at first hyaline then brown, 55 × 30μ (maximum 65 × 35μ), separating and ultimately cohering in a viscous, rounded mass.

On carrion. Connecticut.

This remarkable form made its appearance on a laboratory culture in company with *Cœmansiella spiralis* Eidam. It is not gregarious, appearing here and there on the substratum, and closely resembles a large Mortierella or Syncephalis; the spiral portion holding a drop of somewhat viscous fluid, which gives it the appearance of a large spherical head (fig. 1). The spores mature simultaneously, falling apart and cohering as shown in fig. 4. They are very thick walled and all attempts to germinate them in nutrient media proved fruitless.

The relations of this plant are quite uncertain, no fungus which appears even remotely connected with it being known to the writer. It is placed here among the Hyphomyceteæ

from lack of evidence which would refer it elsewhere. In its mode of growth it recalls Mortierella and similar forms: but its type of spore formation, as well as the character of its spores, is quite distinct from that which occurs in any of the genera of Mucoraceæ; among which, however, it is not impossible that it may eventually find a place.

Gonatorrhodiella nov. gen. — Sterile hyphæ hyaline, creeping, septate and branched. Fertile hyphæ erect, sparingly septate, swelling into a spherical terminal sporiferous head, which after maturity may become once or twice proliferous, the proliferations also forming similar proliferating heads, the resulting hypha presenting ultimately the appearance of a successively inflated filament. Spores formed directly from short processes covering the fertile head, in chains of a definite number, by successive apical budding.

Gonatorrhodiella parasitica n. sp. — Plate XIX, figs. 7–10.

Fertile hyphæ gregarious, simple or rarely dichotomously branched, sparingly septate, hyaline becoming pale fawn colored, seldom more than five times successively proliferous, 8–12μ in diameter, sometimes more than 1 mm. in height. Sporiferous head nearly spherical to oval, rarely producing more than a single proliferation, 25–35μ in diameter, maximum 43 × 36μ. Spores in chains of three, hyaline, then fawn colored, oval to elliptical, caducous, 8.5 × 6 — 12 × 7μ the basal ones the largest.

On Hypocrea and Hypomyces. Connecticut.

This species has been met with in several localities about New Haven always growing directly upon, or running a short distance from certain species of Hypocrea and Hypomyces on which it appears to be parasitic. The genus is distinguished from *Gonatorrhodum* Corda, to which it bears a superficial resemblance, by the absence of the large, septate, subverticillate "ramuli" which give rise to the spores in the last named genus; as well as by its definite spore formation, the indefinite and often branched spore-chains of Gonatorrhodum being replaced by short simple chains composed of a small and invariable number of spores. Whether the successive apical formation of the spores in the present genus does not constitute another essential difference, cannot be determined from Corda's description; but from his figure as well as from analogy with other genera, like Aspergillus, Verticillium, etc. to which he compares it, a successive basal spore formation

may be inferred in Gonatorrhodum from the large basidia or "ramuli," as well as from the spore of the primary chain from which a secondary chain occasionally springs. The present genus is purely Mucedinous; while, as Saccardo remarks, Gonatorrhodum seems rather to belong among the Dematieæ.

Desmidiospora nov. gen.—Spores of two kinds, on the same mycelium of hyaline septate hyphæ: microconidia, small, hyaline, subfusiform, produced at the apex of subulate lateral basidia: macroconidia very large, terminal, brown, flat, multilocular, several times successively, more or less irregularly, dichotomously lobed.

Desmidiospora myrmecophila n. sp.— Plate XX, figs. 1–9.

Hyphæ much branched and septate covering the host in a white flocculent mass. Microconidia subfusiform, slightly asymmetrical $12 \times 2–2.5\mu$, produced sideways at the apex of subulate basally inflated basidia. Macroconidia terminal, short stalked, three to five or even six times successively dichotomously lobed, irregularly multilocular, very thick walled, reddish brown or fawn colored, $80 \times 68\mu$, maximum $100 \times 90\mu$. $12–14\mu$ in thickness.

On a large ant. Connecticut.

This remarkable plant has been met with only once growing luxuriantly on a large black ant which was found fastened to the under side of a rotting log. The hyphæ emerged especially from between the abdominal segments, enveloping the insect more or less completely and extending a short distance over the substratum. It is not impossible that this may be an imperfect form of some Cordyceps, perhaps *C. unilateralis* Tul., which is the only species of the genus that the writer has observed on ants in this vicinity. No analogous form, bearing the same relation to Cordyceps that Mycogone or Sepedonium, for instance, are supposed to bear to other Hypocreaceous genera, has been observed, as far as known to the writer. The microconidia in the present instance are, however, certainly very similar in appearance and mode of formation to conidia known to be associated with certain species of Cordyceps: yet the connection cannot be assumed and the use of a new generic name seems unavoidable. It is not unlikely, moreover, that the fungus under consideration may be mycophilous and like certain species of Gymnoascus, Thielavia, Melanospora, etc., which so often interfere with artificial cultures, be parasitic on an immature Isaria or Cordyceps previously developed within the insect.

Everhartia lignatilis n. sp.—Plate XX, figs. 10–12.

Scattered, superficial, stipitate or substipitate, yellowish becoming blackish towards the base, subcylindrical or expanding upwards, 250–400 × 100–150 μ. Spores hyaline, terminal, 3-septate, cylindrical or slightly flattened, 4 μ in diameter, the rounded base and snout-like apex approaching one another in a single convolution 12–13 × 8–9 μ: extruded in a yellow viscous rounded mass. Sporiferous hyphæ septate, subdichotomously branched, mingled with longer usually simple sterile hyphæ.

On wet logs. Connecticut.

This species occurs not uncommonly about New Haven on very rotten wet logs. It differs from *E. hymenuloides* Sacc. & Ell. in being stipitate as well as in its very distinct and smaller spores. The latter are produced in enormous quantities adhering to the apex in a yellowish viscous drop. The spores germinate readily in water, producing single hyphæ from the convexity of each segment.

EVERHARTIA HYMENULOIDES Sacc. & Ellis.—Plate XX, figs. 13–14.—Figures of the spores of this species are given for comparison drawn from material distributed in Ellis N. A. F. No. 969 on dead leaves of Sorghum nutans. In this species the sporodochia are sessile and ill defined, the spores being produced terminally on short simple hyphæ (fig. 14). The spores are formed in a helix of several convolutions, 16 × 20 μ, and are about 3.5–4 μ in diameter, extruded in a viscous mass and surrounded by a coarsely granular greenish mucus.

EXPLANATION OF PLATES.

Plate XIX.—*Helicocephalum sarcophilum*, n. sp.—Fig. 1. Nearly mature plant showing general habit, with rhizoidal attachment at base and drop of viscous fluid held by the spiral. ×136. Fig. 2. Spiral portion enlarged. ×232. Fig. 3. Young spiral before division has commenced. ×200. Fig. 4. Spiral after maturity, the spores separated and cohering in a viscous mass. ×232. Fig. 5. Two mature spores. ×696. Fig. 6. A spore in optical section. ×696.

Plate XIX.—*Gonatorrhodiella parasitica*, n. sp. Fig. 7. Fertile hyphæ, showing single and double proliferation, the left hand head mature, the right beginning the fifth proliferation. ×232. Fig. 8. Portions of two fertile hyphae, one simple and showing mature spore chains *in situ*, the other furcate and immature. ×348. Fig. 9. Mature spore chain. ×696. Fig. 10. Spore chain showing budding of apical spore. ×696.

Plate XX.—*Desmidiospora myrmecophila*, n. sp.—Fig. 1. Portion of hyphæ showing microconidia on subulate basidia. ×348. Figs. 2–6. Showing successive stages in the development of the macroconidia. ×348. Fig. 7. Macroconidium in which the transverse walls are partly formed. ×348. Fig. 8. Two mature macroconidia. ×348. Fig. 10. Macroconidium viewed horizontally. ×348.

Plate XX.—*Everhartia lignatilis*, n. sp. Fig. 10. General habit showing rounded mass of extruded spores, ×68. Fig. 11. Sterile and fertile hyphae of sporodochium, showing stages in formation of helicospores, ×464. Fig. 12. Mature spores, ×696.

Plate XX.—*Everhartia hymenuloides* Sacc. & Ell. Fig. 13. Mature spores, ×696. Fig. 14. Spore *in situ*, showing terminal formation, ×696.

Notes on North American Mosses. II.

CHARLES REID BARNES.

DICRANUM PALUSTRE LaPyl.—This species has not been noted as particularly variable as is the case with its congener, *D. scoparium* Hedw. The examination of a large series of specimens, collected in various parts of the northwestern United States by Dr. Julius Röll in 1888, has shown me that it is almost as polymorphous as D. scoparium, and that it intergrades so closely with that species that it is quite impossible to limit it except in a wholly arbitrary way. The var. *paludosum* of D. scoparium imitates somewhat the typical D. palustre in the rugulose and shorter pointed leaves. But this is a character by no means constant in the latter species. Indeed it is oftener absent than present. There is also no reliable distinction to be drawn from the section of the costa. We have therefore simply to say that those forms with slender pointed often falcate leaves, having the cells somewhat elongated in the upper part, shall be grouped with D. scoparium. I have not thought it worth while to characterize separately any of those forms of D. palustre (among which the Californian variety *Brewerianum* of Lesquereux may well be placed) which connect with the palustral modifications of D. scoparium. If one should begin, the list might rival that of some of the Sphagna! On the other hand D. palustre shows numerous variations toward forms with broad leaves, entire or coarsely serrated and usually not wrinkled. Three of these I have separated as well-marked varieties,[1] which fall more or less closely into company with the European vars. *juniperifolium* and *polycladon* of the Bry. Eu. Had the intermediate forms been lacking from the collection I should have unhesitatingly established these, or at least the var. *Roellii*, as species.

Having already examined a considerable number of the species of Dicranum in determining the Weisiaceæ of Röll's

[1] Botanisches Centralblatt xliv. 386 (1890).

collection, I hope to study the remaining North American members of the genus shortly.

BARBULA MEGALOCARPA Kindb.—This is the same as *B. ruralis* var. *gigantea* Aust. MS. It is hardly worthy even of varietal rank. Indeed B. ruralis is described by Limpricht[2] as having the awn often reddish and the leaves "*meist* mit vorgezogener, *selten* gerundeter oder ausgerandeter Spitze"—characters on which Kindberg chiefly bases his B. megalocarpa.

WEBERA NUTANS Hedw.—In specimens collected by J. M. Holzinger at Winona, Minn., the cilia are as strongly appendiculate as in any Eu-Bryum. Of course such a statement without qualification would simply throw doubt upon the determination. But in this case there can be no mistake. Leaves from the very perichætium whose fruit was examined were used.

ATRICHUM ANGUSTATUM Br. & Sch.—Intermediate forms between this species and *A. undulatum* Beauv. are not uncommon, and some specimens from Washington, D. C., show lamellæ as much as 9 cells wide! One of the striking features of *A. Schreyni* Aust., of which abundant material has lately been received from the north-west, is the wide lamellæ, but they do not much surpass those on the specimens just referred to.

HYPNUM (Thuidium) PYGMAEUM S. & L.—The stems of this species are described as papillose. These "papillæ" are really short, 2—4-celled, papillose, filiform, rudimentary paraphyllia. They resemble in many ways most of the paraphyllia of H. minutulum, but are less developed. To call them "papillæ" is a misuse of the word.

HYPNUM (Claopodium) RAMULOSUM Hampe.—I think it probable that this is identical with Hooker's H. crispifolium. This opinion is not based upon a comparison of specimens for they are inaccessible, if indeed they exist. But authentic specimens of H. crispifolium agree perfectly with Hampe's (or Müller's) description.[3] Moreover this species is common in the region from which the supposed H. ramulosum comes, while that has never been collected but once. Specimens under this name in the James herbarium from Marin co.,

[2] Die Laubmoose (Rabenh. Krypt.-Flora iv.) i, 687.
[3] Mueller: Synopsis Musc. ii. 486.

California, are H. crispifolium. Finally, the descriptions themselves of the two species show no points of specific difference.

HYPNUM (Camptothecium) NUTTALLII Wils. — This species often has the seta twice or thrice as long as the capsule, instead of "scarcely as long". This is shown by the specimens in at least two sets of Sullivant and Lesquereux' Musci Bor. Amer. I. n. 338b, and also by Macoun's n. 280 Canadian Musci, issued under the name of *H. pinnatifidum* S. & L.

HYPNUM (Isothecium) BREWERIANUM Lesq. — The leaf-cells are short-ovate to rhombic. If it is to be retained under Isothecium the subgeneric character "areolation minute, vermicular-oblong" must be corrected.

HYPNUM (Eurhynchium) COLPOPHYLLUM Sull. — This species has two forms of leaves which often occur on the same plant. The younger are the narrower (ovate to lance-ovate), while the older are broader (elliptic). The narrow form approaches most closely the figures of Sullivant's Icones Muscorum Suppl. pl. 71; the wider are more like those of *E. crassinervium*, but differ from them in the points named in the Manual, p. 353. These narrow leaves often predominate, in which case the aspect of the plants is quite different, so much so as to warrant a distinctive name. This narrow-leaved form of H. colpophyllum may be designated as var. **flagelliforme** n. var.: *leaves lance-ovate, small; branches long, almost flagelliform, attenuate.* In the type the branches are short and tumid-julaceous, leaves densely imbricate and elliptic-ovate. The apiculus is often very short, or the leaves may be simply acute. There is a considerable variation also in the size of the capsule.

NEW LOCALITIES. — The following new localities may be selected from a large number as being of special interest.

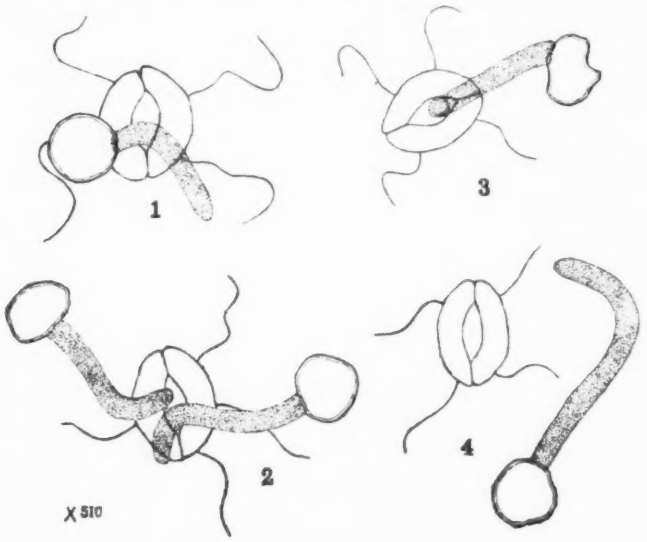
Bruchia Hallii Aust. has recently been sent me from Hockley, Texas, by Mr. F. W. Thurow, an interesting rediscovery of one of Hall's Texan mosses. — *Dicranum hyperboreum* Müll. was collected for the first time in the United States by Röll on Mt. Hood at 7000 ft. altitude. — Mr. J. M. Holzinger gathered a Coscinodon at Winona, Minn., which on comparison with the types proved to be *C. Raui*, previously credited only to Colorado. — The same excellent collector sent also from this locality *Fabronia pusilla* Raddi, *Myurella Careyana* Sull. and *Leskea Austini* Sull.

University of Wisconsin.

BRIEFER ARTICLES.

Penetration of the host by Peronospora gangliformis.— While studying the lettuce mould in the fall and winter of 1890, some observations were made by the writer on the penetration of its germ-tubes that differ from those heretofore recorded.

Spores of the fungus were sown in a drop of water upon the under surface of leaves of lettuce (*Lactuca sativa*). The leaves were kept in a moist atmosphere under a bell-glass in the laboratory. After twenty-four hours pieces of the epidermis were stripped off from the infected spots and examined under the microscope. The spores had germinated abundantly, pushing out a strong germ-tube into which the protoplasm of the spore had passed, leaving the empty, and often shriveled-up spore membrane attached to the germ-tube.



Several cases of penetration were seen, the germ-tubes pushing their way between the guard-cells of the stomata (figs. 1, 2 and 3). In other instances the germ-tubes had approached quite up to a stoma, but had not yet penetrated (fig. 2). Very many of the germ-tubes had grown straight forward for a time, and had then made a rather sudden turn, directing the terminal portion toward a stoma in the vicinity (figs. 2 and 4).

These observations are confirmed by those of Mr. A. J. Pieters, who obtained results from sowings of spores upon leaves of a growing plant. No cases of penetration through the walls of epidermal cells, as is said by De Bary[1] to be the rule for this species, were observed.— W. H. RUSH, *Botanical Laboratory, University of Michigan.*

EDITORIAL.

BOTANY is making a healthy and vigorous growth in the United States. Never before have there been so many teachers, so many investigators, or so many collectors advancing the interests of the science and making its merits known to the public, as at the present time. Probably no field of the science is now wholly without workers, a statement that could not have been made a few years ago; and what is really more to the purpose, a constantly increasing proportion of the work accomplished has a permanent value and attains a rank of commanding importance.

THE ORGANIZATION of the Botanical club of the A. A. A. S., in 1883, gave a decided impetus to American botany, and especially effected an improvement in the character of the investigations undertaken by individual workers. The movement set on foot last year in the same association, by which a prearranged series of papers covering certain portions of the higher grounds of the science is presented each year, must also prove valuable. These and other means for raising the standard of work for the individual, and for strengthening the reputation of the science among its friends, have already shown good results and justified the efforts put forth.

SO MUCH has already been accomplished that even greater things may be confidently looked for in the future. The coming meeting at Washington, which promises to have a larger attendance of botanists than ever before, should bring forth some new plans for general or co-operative work. Things may be accomplished by the united interest and effort of the many that would be difficult or impossible for single workers. So plain a truth needs no illustration, but its appreciation in solving specific problems may require considerable enforcement.

A MATTER to be borne in mind for the coming meeting is the unique opportunity afforded by the approaching World's Fair to secure some benefits for botany. A few European visitors of eminence may cer-

[1] Ann. d. Sc. Nat. Bot. sér. 4. xx.

tainly be expected, and an unusually full gathering of American botanists. Hundreds of industrial and other societies are arranging for memorable occasions, and if some of this enthusiasm could be turned in the direction of pure science the result could not fail to be beneficial.

ANOTHER matter not quite as distant may be suggested here. In connection with the papers upon physiological subjects at the Washington gathering, why not exhibit a collection of physiological apparatus? If each laboratory would send a few pieces the display would be made very interesting.

CURRENT LITERATURE.

Practical Botany[1].

The first edition of the Strasburger's Kleine Botanische Practicum published in 1886 has been one of the most useful of the handbooks of recent years. It had its defects, some of which were pointed out in this journal (vol. xii. 91) but they were not such as to seriously impair its usefulness. In this revised edition the author has much improved the book. Considerable additional matter has been inserted, notably in chapters xi, xxii, xxiii, xxvii, xxviii and xxx, and chapters ix and xxi have been almost entirely rewritten. Altogether 52 pages have been added and there are about 20 new figures. It is extremely difficult to make such extensive changes fit in with the old stereotyped plates. This has been done however with a minimum of injury to the appearance of the book, only a few pages being unduly leaded. One could have wished however that so many of the page numbers had not been carried to the inner edge of the page, and that when change was being made these might have been transferred where necessary so as to stand in their proper place.

The figures of the present edition are much better printed than in the first. They now compare favorably with those of the German edition. In every way the book is well manufactured. The suitable paper and loose binding are especially commendable in such a laboratory guide. We hope that it may by reason of these betterments meet with a still wider sale in this country.

[1] STRASBURGER, EDWARD, — Handbook of practical botany, for the botanical laboratory and private student. Edited from the German by W. HILLHOUSE; revised by the author, and with many additional notes by author and editor. Second edition, revised and enlarged. 80 pp. xxiv. 425 (+ 52) figs. 149. New York: Macmillan & Co. [London: Swan Sonnenschein & Co.] 1889.

The new Gray's Manual.[1]

The revised (6th) edition of the Manual has been fully noticed in this journal (xv, p. 71). No one who has had any experience in book-making was surprised that there should occur a considerable number of errors and omissions in the first issue of this edition and some of the reviews of the book would have been less absurd had their writers taken some account of human fallibility. In this second issue an attempt is made to give "all such needed emendations of every kind as have come to our [the authors'] notice. Whenever it could be conveniently done these alterations have been made in the plates." The remainder are printed on four pages following p. 735 (designated 735 *a*, etc.) The corrections in the plates are numerous—over 100 of one sort and another. Seventeen species appear among the "supplementary additions and corrections"—and two genera, Franseria and Paulownia.

The pocket edition of the Manual is a gem in its way and certainly "fills a long-felt want." It weighs only 14 ounces and is about ⅞ of an inch thick—just the thing for carrying easily. It is bound in delightfully soft flexible leather, and looks as though it would be durable. We can suggest only one improvement short of India paper and silk-sewing—that is, slightly rounded corners, so as not to catch on the pocket. No botanist who has a copy of the library edition will ever carry that with him after he has seen this. The American Book Company has merited our gratitude for dressing this volume so serviceably and at the same time so handsomely. The *very low* price ($2) will certainly make this as popular as it is handsome.

Introduction to the Study of Botany.[2]

He who gets an introduction to the science of botany through the medium of this book will probably have little inclination to cultivate the acquaintance. If this book is a fair indication, Mr. Edward Aveling, D. Sc. (God save the mark!) has need himself to be introduced to the fair science whose most difficult task he has essayed without adequate knowledge.

---

[1] Gray, Asa.—Manual of the botany of the northern United States. Sixth edition, revised and extended westward to the 100th meridian by Sereno Watson and John M. Coulter. 8° cloth. pp. 760 (+ 4). plates xxv. New York: American Book Co. 1891. $1.60.

The same, pocket edition, 4¾ × 7½ inches, full leather, flexible. $2.

[2] Aveling, Edward.—An introduction to the study of botany. 12° pp. iv, 363. figs. 271. London: Swan Sonnenschein & Co. (N. Y.: Macmillan & Co.), 1891.

The book takes as its "basis the syllabus of subject xv, botany, from the Science and Art Department" of South Kensington, and proceeds to expound the science from this "examinational" standpoint. It is perhaps a fair inference that this "basis" is somewhat narrow, for we read early: "Broadly, biology is the science that deals with living bodies. General biology, as understood *in the examinational sense*, considers certain typical living bodies in their structure and life-history." We should have no quarrel, however, with the basis, were the superstructure sound.

In the body of the book eighteen flowering plants are described with considerable detail, the object, apparently, being to introduce as many terms, with their definitions, as possible. Then follow chapters on the vegetable cell, cell contents, tissues and systems, the root, stem, leaf, inflorescence, floral organs and fruits. A glossary — are we never to get rid of this as the animus of elementary botanical text? Not content to have the book mainly such, the author urges "upon the student and teacher the importance, the necessity, of everyone constructing his own glossary. The earnest student will, as he meets with each new word, then and there enter it in his vocabulary. At the end of this volume will be found a glossary put together by me, and this the student can compare with his." Here is a sample of it:

WORD.	DERIVATION.	DEFINITION.	EXAMPLE.
Thorn.	. . . . .	A modified organ, hard and sharp.	Sloe.
Tissue.	. . . . .	A constituent of an organ.	Parenchyma or muscle.
Tripinnate.	tres, three; pinna, a leaflet.	Divided into three leaflets.	Leaf of hemlock.

It is to be hoped that the student will succeed better than the author, for of the three definitions, selected at random within a space of seven lines, not one is accurate. And why should not the derivation of "thorn" and "tissue" be sought out, as well as that of words with Greek and Latin roots? But what is the use of any of it? Would a student of English literature be urged to construct for himself an English lexicon?

Dr. Aveling makes much of derivations however. Witness the following: "The upper [leaves] have no stalk or petiole, and are therefore said to be sessile. *Sedeo, sedi, sessum, sedere*, I sit." Why omit the rest of the conjugation? "The particular kind of inflorescence is therefore a *corymb*. κορυμβος. (*korumbos*) a cluster of fruit, especially of ivy-berries (Vergil, 'Bucolics,' Ecl. iii. 39)." To which the skeptical are respectfully referred. And this (verbatim) is particularly good: "the Orpine is of the order Crassulaceæ, thus named from the thickness of its leaves. *crassus*, thick. Species, *Sedum*; genus, *Telephium*. *Sedum*,

from the sessile nature of the genus; *Telephium*, in the old over-classical fashion, from Telephus, the son of Hercules."

The author is evidently enamored of tabular arrangement, for he introduces tables, big and little, fragmentary and complete, at every available point.[1] Here is one at random, from which their value may be judged: "The fruit of the hazel can be worked out by reference to the fragment of the complete table given on p. 137." Then the entire page 137 is devoted to this, by means of which the fruit of the hazel ought to be "worked out" without severe mental strain:

FRUITS
- monogynœcial.
  - simple.
    - syncarpous.
      - each carpel with one seed.
        - superior.
        - inferior.
    - apocarpous.
      - each carpel with more than one seed.
  - compound.
- polygynœcial.
  - superior.
    - 1-celled, with cupule—GLANS.
  - inferior.
    - 2-celled.

Page after page is covered with these "fragments," which are gathered up, warmed over and spread out again in later "tables."

As specimens of the information imparted by this "introduction" read the following:

"The common name for the gynœcium [of the Buttercup] is the pistil."

"Consider now only one carpel. It is clearly monogynœcial."

"Raceme . . . *Racemus*, a bunch of grapes, one of the best examples of this kind of inflorescence."

" . . . glaucous. This last word is used for a surface of excessive, shiny smoothness."

"The rootstock of the Cyclamen is a tuber. The most familiar example of a tuber is a potato. The tuber of the Cyclamen is a rootstock structure; that of a potato is formed from a branch . . . and is therefore a stem structure."

Here is a bit of technique: "And even in their case [leaves of Sedum and Hyacinth] it is wise to cut up the leaf into fragments, throw the pieces into melted paraffin, and when this has cooled and solidified, make thin sections through this and the embedded leaves." The naiveté of these directions will be very impressive to those who know the paraffin process.

After five pages on these subjects, good, bad and indifferent, the author avers that "The cell-wall, protoplasm, nucleus, starch grains, aleurone grains are now understood." That and the following which comes from near the close of the book must prove very cheering to the weary student: "If the student will now turn to the syllabus of the

[1] No less than 10 per cent. of the pages are occupied with such tabular views. Another 10 per cent. the glossary takes.

Science and Art Department printed in our first chapter, he will see that we have cleared off [but not up] not only the whole of the general morphology, histology and physiology, but also . . . ."

Here is the beginning of the discussion of vessels: "A vessel in botany [sic] is formed out of a number of cells placed vertically one above the other, whose partition walls vanish. The simplest kind of vessels are *vasa propria* (vessels proper)—elongated cells with a thickening of the wall that takes the form of a very fine network. The student will note once again how artificial our definitions are, and how the botanical categories overlap each other. A vessel is defined as a tube formed by the fusion of several cells, and the first kind of vessel described, *vas proprium*, is made up of one cell. The second form of vessel is the sieve tube. . . . sieve tubes are also called vesicular or utricular vessels. They are common in the bulb of the onion . . . and other Monocotyledons. The sieve tubes contain a milky juice and very often crystals."

The physiology is no better: " . . . the roots take in the nitrogen-containing food-stuffs and the leaves especially take in the carbon-containing food-stuff. From the roots the former must move up until they meet the latter coming down from the green parts. When the two sets of food-stuffs meet, the manufacture of those important plant structures that contain carbon, hydrogen, oxygen, nitrogen, must occur, and from the place where this manufacture occurs, diffusion of these substances to other parts of the plant must follow. . . . This taking in of food is assimilation."

But to continue would be to occupy space to no good purpose. What we have given is not a selection of isolated blunders. It might be increased ten-fold without exhausting the supply of error and absurdity. Some of the illustrations, could we reproduce them, would be as ludicrous as the text.

We should be glad to be able to say something favorable about this book, if, even after careful search, we could find it. But the plan is crude and the execution wretched. Yet if we do not mistake the tone of the book the author feels that he has done a creditable piece of work, and the publisher hopes to gain for it a sale in this country. It is a pity that so reputable a house should be so imposed upon by a worse than worthless text-book.

OPEN LETTERS.

The Manchester group of botanists.

A PHOTOGRAPH of twenty-five botanists was shown at the Indianapolis meeting of the A. A. A. S. and a number of persons expressed a desire to obtain copies of it. As an accommodation to those who may wish a copy, I will send an order to the photographer for as many as are wanted, and distribute them upon their arrival.

The group was taken at Manchester, England, in 1886, and was the company who gathered at the hospitable home of Prof. Williamson to do honor to the visit of Dr. Asa Gray. All departments of botanical science were represented. The group embraces: Messrs. McNab, Jessen, Treub, Solms-Laubach, Weissmann, Saporta, Baker, Lankester, D'Arcy Thompson, Dyer, Cohn, De Bary, Williamson, Asa Gray, Pringsheim, Carruthers, Gardiner, Oliver, Vines, Marshall Ward, C. Bailey, Balfour, Bower, Potter and Vaizey. The picture is 10 by 12 inches, and an excellent portrait of each individual. The price will be $1.35 unmounted or $1.75 mounted on a neat card 14 by 16 inches and the names written underneath. Those wishing copies will please send in their names as early as possible.— J. C. ARTHUR, *La Fayette, Ind.*

Monomialism.

I like the tone of the editorial in the May GAZETTE upon nomenclature. The propagators of this new fashion of naming plants are so confident of success and have so often predicted that the whole botanical world must make unconditional surrender, that I hasten to express my own feeling in the matter before my guns are spiked and my arms confiscated.

I suppose that the object of a name is to afford some ready and tolerably permanent means of designating a particular plant. And we have always been taught that it is no part of any system of nomenclature to give credit to any person. An author's name is attached to any plant for the simple purpose of identifying the plant name and we are also taught that the oldest name of any plant must stand. In order to meet these various requirements, botanists have been in the habit — erroneously, it now turns out — of employing two words to designate the plant, and this has been known as the binomial system of nomenclature. But now they are telling us that these two words do not constitute *the name* of the plant, but that *the name, per se*, is the second word of the two. In other words, *saccharinum* is the name of the sugar maple, *Canadensis* is the name of a Cornus—although one of my botanies declares that it is the name of a rush and even of a spruce!— and that *repens* is the name of white clover. This is the monomial system of nomenclature, and its devotees are delving through every author in the hope of finding *the name* of the plant. When this name is found—or supposed to be found, which amounts to the same thing —it is attached to some generic name to which it was never designed to fit, and the twain, to which an algebraic formula has been attached, is given to the world as the monomio-binomial name of the plant.

Now there is only one reason why I object to all this, and that is that it serves no purpose. It adds nothing to the stability of the name

but rather weakens it. In many cases we can hardly hope to find the oldest specific name which chanced to be applied to the plant, and we can seldom be sure that we have found it, while it is a comparatively easy and sure process to find the oldest binomial. I deny the proposition that the specific name is *the name*. It does not designate the plant and therefore fails to satisfy the first demand of a name. The binomial answers every requirement of the definition of a name, and it has the distinct advantage of dating from a definite point,—the work of Linnæus. But if we once begin to attach the oldest specific name to any genus whatever — as the fashion of the time may determine — there is no reason why we should stop our search for specific names with the time of Linnæus. In fact, some botanists are even now advising the use of names from the old herbalists, and the system, if logically prosecuted, must eventually include them. I cannot see one point in favor of the new system. It certainly weakens the permanence of nomenclature, for there is less reason to suppose that the mono-binomial is permanent than that the most recent binomial is. After fifty years or so of this upheaval we would be practically just where we are now, except that we should have added cumbersome formulas to nearly all our names. The new mongrel binomials would be subjected to just the same chances as those we now employ. We would have digged a hole for the extreme satisfaction of filling it up again.

The straits into which this new system often leads one are ludicrous. But I object to the untruthfulness of it, in many cases. Carex affords many examples. Tuckerman in 1843 designated a plant, which he took to be a form of *Carex scoparia*, as var. *moniliformis*, and another one thought to belong to *C. straminea* as var. *moniliformis*. Subsequently, Olney determinined that the latter is a distinct species and called it *Carex silicea*. Shall we now overturn the oldest specific name (silicea) — as is done in the Catalogue of Plants of New Jersey — and make an old varietal name a specific one? Shall we make Tuckerman say that he was mistaken and compel him, even indirectly, to raise his variety into a species? *Carex moniliformis* is not Tuckerman's. It is Britton's, and dates from 1889. Olney's name dates from 1868, and I see no other way than to make Britton's name a synonym of Olney's, as we have always done with recent names for all species. And if the var. *moniliformis* of *C. scoparia* should be erected into a species—what then?

They tell me that if botanists had always followed the methods of zoologists, using the oldest specific name in whatever genus, we should have been all right now. But as we did not start in this way, I do not see the force of the statement.

One of the most mischievous features of the whole thing is the ease with which authors of local floras obtain a cheap notoriety by making new combinations—which will likely be changed by the next cataloguer — and the extent to which it fosters the notion that making a new name and differing from an authority are the chief ends of systematic botany.—L. H. Bailey, *Cornell University*.

NOTES AND NEWS.

DR. RICHARD SCHOMBURGK, director of the Botanic Gardens at Adelade, South Australia, died March 24, aged 80 years.

CORRECTION.— The name of J. N. ROSE should be inserted as joint author with J. M. Coulter of the new species, *Courseia axillaris*, published last month, p. 180.

VON KLINGGRAEFF has observed Drosera Anglica in west Prussia catching butterflies—Papilio Daplidice and P. Rapae—through the cooperation of several leaves.

DR. GEORGE MACLOSKIE, of Princeton college, has charge of the biological work at "The Seaside Assembly," at Avon-by-the-sea, N. J., during this summer. The work extends from July 5th to August 28th.

AN EXPEDITION has been organized to study Mt. Orizaba, Mexico, during the present summer. Mr. Henry E. Seaton will act as botanist and make a study of the flora in relation to altitude and other conditions.

PROFESSOR JOHN M. COULTER will spend much of the summer along the Mexican border studying the *Cactaceæ*. The work is under the direction of the Department of Agriculture. Messrs. Walter H. Evans and G. C. Nealley will act as assistants.

REV. F. D. KELSEY, of Helena, Montana, has been endeavoring to stir up the spirit of botany in his state by delivering courses of lectures in the different colleges. During the last year he has delivered these courses at Wesleyan College, Helena, and College of Montana, at Deer Lodge.

WITH THE beginning of the second volume, *Zoe*, the biological journal of the Pacific coast, becomes a quarterly, and several biologists are associated with Mr. Brandegee as editors. We fear that the publication of the numbers at so long intervals will be disadvantageous. The April number has a lithograph portrait of Dr. H. W. Harkness as a frontispiece.

A DIRECTORY of European botanists has just been issued by Wilhelm Engelmann, of Leipzig, under the title *Botanisches Adressbuch*, which will be of much service to correspondents. A new edition of Cassino's International Scientists' Directory is being prepared, and will be issued early the coming year. Such works are of value in proportion to their completeness and accuracy, and every person owes it to his fellow workers to see that his own address is properly inserted.

ERRATA.—The following corrections should be made in Mr. Hitchcock's article on West Indian plants. Page 137, line 3 from bottom and p. 138, line 3, for sap read *sop;* line 20, for savory, *curry;* fotnote 24, for Rollinia Sieberi, *Anona squamosa;* footnote 26, for Anona squamosa, *A. muricata;* p. 138, line 12, for mashed, *washed;* line 4 from bottom, for ocara, *ochra;* footnote 42, for Abelmoschus moschatus, *A. esculentus;* footnote 41, for Lechium, *Sechium;* p. 140, line 2, for pie, *pea;* line 5, for roots, *nuts;* line 15, for Lucca, *Lucea.*

A NEW journal devoted to plant diseases, entitled *Zeitschrift für Pflanzenkrankheiten* has made its appearance under the editorship of Dr. Paul Sorauer, and with the assistance of many able investigators, including Prof. Farlow, Prof. Humphrey and Mr. Galloway, of this country. The price is M. 15 ($3.75) a year. The editor is the author of the largest and best treatise on plant diseases yet published, and the foremost investigator in this line of study. The journal will undoubtedly prove specially acceptable and serviceable to a large circle of investigators.

THE CALIFORNIA Botanical Club was organized March 7th. In response to a call from Dr. H. W. Harkness and others a meeting was held in the herbarium room of the California Academy of Science at which the objects of the proposed club were set forth. May 2nd the charter roll of members was declared closed with 99 names. The list includes a considerable number of the more prominent botanists about San Francisco, but a few names are conspicuous by their absence. The club is to meet on the first and third Saturdays of each month at the rooms of the California Academy.

MISS ROSINE MASSON died in Lausanne, May 6th, aged 83 years. The deceased had attained a wide reputation in Europe and was known in this country by her extensive collections and distributing of alpine plants, principally collected by herself even to her very last days. The specimens distributed by her showed great care in preparation and identification. Besides rendering valuable contributions to the knowledge of the flora of Switzerland, she deserves much credit for the assistance she has given to the study of botany by her magnificent collections, deposited in several of the most prominent scientific institutions.—T. H.

A SHORT communication in the *Centralblatt für Bakteriologie* (ix, 557) gives the comparative results arrived at by Dr. George Canera in studying the various forms of swine epidemic, known under the names of hog-cholera, swine-plague, swine-pest, etc. The germs were obtained from about a dozen of the most prominent investigators, and were uniformly grown upon and in various media, and their behavior carefully compared. The germs were found to belong to several different species, and to fall into three well marked classes, dependent upon their movement and other characters. Billings' swine-plague and Salmon's hog-cholera germs are said to be specifically different.

ANOTHER revolution has taken place in the matter of postage on botanical specimens. The act of Congress, approved July 24, 1888, fixed the postage on "seeds, cuttings, roots, scions and plants . . at the rate of one cent for each two ounces or fraction thereof." But the May Postal Guide contains a ruling by the Third Assistant Postmaster-General by which *dried* plants and *cut flowers* are specifically excluded from the provisions of this act and declared subject to the cent per ounce rate! By what legerdemain of logic this conclusion was reached the official document fails to state: but until more common sense or a specific act of Congress supervenes botanists will have to double the postage on their packages.

PUBLICATIONS
OF THE
TORREY BOTANICAL CLUB.

I. THE BULLETIN.

Published monthly at $2.00 a year. Recent volumes have each contained about 320 pages, or an average of about 27 pages a month, with numerous illustrations. The old subscription price of $1.00 was increased to $2.00, beginning with January, 1891. The editors hope to increase the number of pages materially, and thus be able to publish papers more promptly than has recently been possible. The Bulletin has been published since 1870 and nearly complete sets of it can be supplied at $1.00 per volume.

II. THE MEMOIRS.

No. 1 of Volume II of this serial, containing Professor Byron D. Halsted's illustrated payer on "Reserve Food Materials in Buds and Surrounding Parts" has recently been issued. Price, 50 cents. Volume I, complete, containing papers by Professor L. H. Bailey, on "Studies of the Types of Various Species of the Genus *Carex*"; by Mr. Isaac C. Martindale, on "A List of the Marine Algæ hitherto observed on the Coasts of New Jersey and Staten Island;" by Dr. Richard Sprnce, on "An Enumeration of the Hepaticæ collected by Dr. H. H. Rusby in South America," containing descriptions of many new species; and by Dr. R. Lewis Sturtevant, on "Seedless Fruits," may be had for the subscription price, $3.00. The price of Volume II complete will be the same.

The catalogue of plants growing within 100 miles of New York, published in 1888, may still be had at $1.00 a copy.

All communications should be addressed to

Editors of the TORREY BOTANICAL CLUB.

Columbia College, New York City.

Money orders should be made payable at Station H.

VALUABLE PLANTS FOR SALE.

The herbarium of the late Dr. C. C. Parry, the Western explorer, has recently been carefully arranged and catalogued, and the list is now in press. The collection is particularly rich in Western and Southern plants, and would make a very valuable addition to an Eastern herbarium which lacks those plants It is now offered for sale by Mrs. Parry, and copies of the list will be sent (when issued) on application to

Mrs. E. R. PARRY, Davenport, Iowa.

ON SALE:

Complete set of the best English Horticultural Paper:

Gardener's Chronicle and Agricultural Gazette.

1841 to 1890, bound ½ calf in yearly vols., £31.10.

Important to Botanical Gardens, Agricultural Stations and Public Libraries. Sets are very scarce.

☞Many odd volumes of the same kept in stock.

G. BUCKLE, 60 Stanhope Str., Newcastle Str., W. C., London, Eng.

FOR SALE.

North American Lichens, in sets. The undersigned has just returned from collecting, and the above sets include twenty new discoveries.

Fifteen volumes of THE BOTANICAL GAZETTE. Address

W. W. CALKINS, 147 California Ave., Chicago, Ill.

A NEW BOOK
FROM COVER TO COVER.
Fully Abreast with the Times.

WEBSTER'S
INTERNATIONAL
DICTIONARY

A GRAND INVESTMENT
for the Family, School, or Professional Library.

The Authentic Webster's Unabridged Dictionary, comprising the issues of 1864, '79 & '84, copyrighted property of the undersigned, is now Thoroughly Revised and Enlarged, and as a distinguishing title, bears the name of Webster's International Dictionary.

Editorial work upon this revision has been in active progress for over Ten Years. Not less than One Hundred paid editorial laborers have been engaged upon it.

Over $300,000 expended in its preparation before the first copy was printed.

Critical comparison with any other Dictionary is invited. Get the Best.

G. & C. MERRIAM & CO., Publishers,
Springfield, Mass., U. S. A.
Sold by all Booksellers. Illustrated pamphlet free

R. FRIEDLÄNDER & SOHN, Natural History Booksellers,
Berlin (Germany) N. W., Carlstr. 11,
have published every fortnight, since 1879
Naturae Novitates: Natural History News.
Bibliographic List of the current Literature of all Nations on Natural History and Exact Sciences.
Price $1 per year (52 Nos.) post-free. Specimen-number gratis on application.
1891, ninth year of publication.
Back volumes, each complete with index, still to be had.

A Provisional Host-Index of the Fungi of the U. S.

By W. G. FARLOW and A. B. SEYMOUR.

Including the species recorded on plants and animals up to the present time with synonymy of the fungi arranged chronologically. ***Price, $3.00.***

For Sale by

CHAS. W. SEVER, Harvard Sq., Cambridge, Mass.